

What Is Claimed Is:

1. A nanoscale grasping device for the manipulation of microscopic objects, comprising at least three electrostatically actuated grasping elements.

2. The nanoscale grasping device of claim 1 wherein said at least three grasping elements comprise a fibrous material.

3. The nanoscale grasping device of claim 2 wherein at least one of said grasping elements comprises a carbon nanotube.

4. The nanoscale grasping device of claim 3 wherein said carbon nanotube is grown by a chemical vapor deposition (CVD) technique.

5. The nanoscale grasping device of claim 2 wherein at least one of said grasping elements is

chemically functionalized to bind specific molecules  
to said grasping element.

5           6.    The nanoscale grasping device of claim 2  
              wherein at least one of said grasping elements is  
              chemically functionalized to bind particles to said  
              grasping element.

10           7.    The nanoscale grasping device of claim 1  
              wherein each of said at least three grasping elements  
              is independently supplied with a voltage sufficient to  
              induce electrostatic forces between at least two of  
              said grasping elements, whereby to close or open said  
              grasping elements.

15           8.    The nanoscale grasping device of claim 7  
              wherein a steady state voltage is applied to at least  
              one of said grasping elements.

9. The nanoscale grasping device of claim 7 wherein an oscillating voltage is applied to at least one of said grasping elements.

5 10. The nanoscale grasping device of claim 9 wherein the oscillating voltage applied to at least one of said grasping elements is in phase with the oscillating voltage applied to at least one of the remaining grasping elements.

10 11. The nanoscale grasping device of claim 9 wherein the oscillating voltage applied to at least one of said grasping elements is substantially out of phase with the oscillating voltage applied to at least  
15 one of the remaining grasping elements.

20 12. The nanoscale grasping device of claim 1 wherein resonant vibration in said grasping elements is cancelled by oscillating voltages applied to said grasping elements.

13. The nanoscale grasping device of claim 1 wherein resonant vibration in said grasping elements is enhanced by oscillating voltages applied to said grasping elements.

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14. The nanoscale grasping device of claim 12 wherein said resonant vibration is thermally induced.

15. The nanoscale grasping device of claim 12 wherein said resonant vibration is mechanically induced.

16. The nanoscale grasping device of claim 1 wherein said grasping device comprises three grasping elements, and further wherein a steady state voltage is applied to two of said grasping elements while the remaining grasping element is left at a fixed voltage so as to induce electrostatic forces between said grasping elements, whereby to open or close said grasping elements.

17. The nanoscale grasping device of claim 18 wherein said fixed voltage is ground.

5 18. The nanoscale grasping device of claim 1 wherein said grasping device comprises three grasping elements, and further wherein an oscillating voltage is applied to each of said three grasping elements, with the phases of the oscillating voltages being substantially different on all three grasping  
10 elements, thereby inducing electrostatic forces between said grasping elements.

15 19. The nanoscale grasping device of claim 18 wherein the oscillating voltage applied to each grasping element is substantially 120 degrees out of phase with its neighboring grasping elements.

20 20. The nanoscale grasping device of claim 1 wherein said grasping tool comprises four grasping elements, and further wherein a steady state voltage is applied to two neighboring grasping elements, and

the remaining two grasping elements are left at another voltage.

21. The nanoscale grasping device of claim 20 wherein said another voltage is ground voltage.

22. The nanoscale grasping device of claim 1 wherein said grasping tool comprises four grasping elements, and further wherein a steady state voltage is applied to two diametrically opposite grasping elements, and the remaining two grasping elements are left at another voltage.

23. The nanoscale grasping device of claim 22 wherein said another voltage is ground voltage.

24. The nanoscale grasping device of claim 1 wherein said grasping tool comprises four grasping elements, and further wherein an oscillating voltages are applied to each of said grasping elements, with each oscillating voltage being substantially 90

degrees out of phase with the other oscillating voltages.

5        25. The nanoscale grasping device claim 1 where said grasping device comprises n grasping elements, wherein n is greater than 4.

10       26. The nanoscale grasping device of claim 25 wherein steady state voltages are applied to said grasping elements so as to induce electrostatic forces between said grasping elements.

15       27. The nanoscale grasping device of claim 25 wherein an n phase oscillating voltage is applied to each grasping element, substantially  $360/n$  degrees out of phase with said other grasping elements.

20       28. The nanoscale grasping device of claim 1, wherein at least one of said grasping elements is adapted for use as a probe in atomic force microscopy and scanning probe microscopy techniques.

29. The nanoscale grasping device of claim 1,  
wherein at least one of said grasping elements is  
adapted for use in performing electrical and  
mechanical analysis of the sample.

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